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GOVERNMENT OBSTACLES TO THE COMMERCIAL USE OF SPACE

INTRODUCTION

Space today is a multibillion dollar industry. It can grow to many times this. So far commercial use of space has been limited mainly to technologies relying on unmanned satellites, for such purposes as telecommunications and remote sensing. Soon, however, space-based manufacturing will become a reality.

As industrial revolutions before it, the advent of space-based manufacturing could herald an era of extraordinary economic expansion. By the year 2001, those space manufactured products already planned are expected to generate annual sales of over \$65 billion. Taking into account other space products that are sure to be developed, space commerce by the end of this century could reach more than \$200 billion a year. As man's experience in space grows, and his understanding of its potential increases, the rate of growth for space manufacturing will increase as well. By the year 2010, space-based and space-related enterprises could add between \$500 billion and \$1 trillion to the U.S. gross national product.¹

As promising as is the potential for space commerce, it can only be realized in an appropriate legislative and institutional

¹ The figures in this section were derived through use of a model based on historic growth patterns from selected industries including automobiles, aviation, computers, and nuclear power.

This is the second in a series of Heritage Foundation studies on space commercialization. The first, Background No. 392, "Enterprise in Orbit: The Commercial Potential of Space," by Milton R. Copulos, appeared on November 20, 1984.

environment. As with any infant industry, the commercial development of space requires huge capital investments, and entails enormous risks. Investors will not provide the capital, and entrepreneurs will not assume the risks if they first must overcome a tangled web of bureaucratic, regulatory, and legal roadblocks. Such roadblocks, therefore, must be identified and eliminated.

Some progress toward this already has been made by the Reagan Administration through its creation of an Office of Commercial Space Transportation within the Department of Transportation, and by the establishment of an interagency working group to define the government's role in space. Perhaps the most important contribution to the future of space commerce has been the President's willingness to articulate his belief that space commercialization should be a national priority, thereby giving the concept a high level of credibility.

Still, many obstacles impede man's drive to put enterprise in orbit. New means of capital formation are needed. Restrictions inhibiting the pooling of resources must be eliminated so that enormously expensive ventures can be undertaken. Many legal questions concerning issues such as patent and property rights need resolution. In addition, the procedures for obtaining permits need to be simplified, so that space entrepreneurs need not negotiate a maze of agencies with conflicting rules before they can launch a space vehicle. And regulations must be reviewed to ensure that they conform to the new era of space commerce and do not inadvertently hold back space ventures.

The most important first step, however, is to stop the National Aeronautics and Space Administration's (NASA) dominance of the process of commercializing space. Artificially low prices for launches of commercial satellites by the Space Shuttle, plans to subsidize selected commercial projects, and reported attempts to dissuade NASA's contractors from marketing competing satellite launch systems will only delay the commercial development of space.

SHUTTLE PRICING AS AN OBSTACLE

Probably the greatest barrier to development of a private sector space industry is the continuing underpricing of satellite launches on the NASA Space Shuttle. A private space transportation system is essential for the development of a market-based private space sector. Without it, the industry will always be dependent upon the whims of government. This would lead, as it always has, to an inefficient use of resources. No private system can evolve as long as it has to compete with government subsidies. No matter how low an entrepreneur were to price his service, NASA could always underbid him by offsetting its costs with federal subsidies. To be sure, NASA is supposed to alter its prices to reflect "full cost recovery" for future commercial satellite launches. In reality, however, its projected future launch fees still appear to contain a significant subsidy.

The price of a commercial launch on the Space Shuttle is scheduled to rise from its current \$38 million for a full cargo bay to \$71 million by 1988 and \$87 million by 1991. According to NASA's own congressional testimony, however, the cost of a Shuttle Launch is actually in the range of \$150 million, and private estimates place the figure even higher. This means that even with the price increase, taxpayers will still be subsidizing half of the cost of commercial satellite launches performed by the shuttle, even when so-called "full cost recovery" is achieved. Comparable private launch systems, therefore, will have to cut their costs to less than half of NASA's shuttle to compete. Further, by phasing in the new launch prices over several years, rather than immediately, NASA may be able to block the entry of competitors long enough to discourage investors from attempts to develop private launch services. The extent of NASA's concern that private competition would readily capture much of the commercial launch market was underscored in recent statements by the agency's Administrator, James Beggs, regarding the Air Force proposal to launch twelve of its own satellites and three of the National Oceanic and Atmospheric Administration's weather satellites using Titan II rockets. He complained that not only would the shuttle lose the government launches, but that private firms might be encouraged to use the lower-priced rockets instead of the shuttle.

Even if the "full cost recovery" price were charged for all of the projected 227 missions the four orbiters are scheduled to fly, this price still would be \$14.3 billion below the true price-- and this assumes that NASA's estimated cost per shuttle flight of \$150 million is correct. If higher estimates made by private sources are correct, the subsidy could be over \$37 billion, or more than \$3 billion annually. Little wonder that private firms find it difficult to compete with the Shuttle or that they have difficulty raising risk capital to do so.

Supporters of NASA's pricing policies argue that without subsidized shuttle flights, commercial launches would not be performed by private U.S. firms, but be diverted to the European Ariane launch system. They argue that private firms would not be willing to spend the billions of dollars needed to capture the launch market. Similar arguments, however, were once advanced concerning the supersonic transport (SST). Advocates maintained that the SST's British and French developers would capture the commercial supersonic aviation market with their Concorde, and severely harm the U.S. aviation industry. History is proving them wrong. Less expensive jets more attuned to the changing market, such as the Boeing 747 and the DC-10, have maintained the decisive competitive edge enjoyed by private American manufacturers. Today there are only a handful of SSTs still flying, whereas the jumbo jet is the master of the skies. Had these private U.S. planemakers faced competition from a heavily subsidized American SST, the entire industry would have been jeopardized.

Other NASA Influences on Space Development

There are proposals that the federal government provide "seed money" for space ventures, create markets for selected products, offer preferentially priced or even free shuttle launches to firms willing to enter into joint ventures with the agency, and that NASA should engage in commercialization research.

By providing "seed money" to help finance specific commercial enterprises, say NASA officials, the agency would help reduce the risks of starting up space ventures, and thereby make them more acceptable to otherwise cautious investors. Such reasoning rests on the same faulty foundations as the arguments calling for federal programs to stimulate new industries, such as the costly Synthetic Fuels Corporation. Rarely have such programs succeeded. In fact, they often divert scarce engineering talent and capital away from more productive alternatives. More important, such subsidies ignore the essential fact that if the market senses that an industry has potential, the market will provide the capital after discounting extraordinary risks. But if the millions of investors who comprise the capital markets see no potential in the project, federal money should not be pumped in to "save" it, for there is little likelihood that federal officials will prove more perceptive than private investors.

NASA's proposal that it offer preferential pricing or even free rides on shuttle launches for selected joint ventures where the agency is a partner is an undisguised attempt by NASA to steer commercial space development. Discounted or free shuttle rides would amount to a subsidy of up to \$150 million for commercial ventures. This violates NASA's charter, which never envisioned the agency engaging in purely commercial activities. It also would penalize potential competitors of these selected ventures, for NASA's participation would mean substantially reduced costs for the private partner.

NASA's proposal that it engage in research in areas identified by industry as helpful to commercialization would not be objectionable if there were some guarantee that the agency would limit itself to research of a general nature and not engage in research aimed at specific products. Specific research, after all, would distort the industry and encourage firms to lobby for special support.

While NASA's suggestions may be well meaning, they reflect NASA's emerging policy to become the architect of commercial space activity. Were such a policy to be carried out, it could have disastrous consequences. Every large bureaucracy inherently shuns risk. Yet it is the process of investors taking risks with their own money that drives the American economic system.

In addition, bureaucracies by nature do not foster major innovations. Yet bold innovation is essential for successful commercialization of space. Bureaucratic decisions, moreover,

are in often aimed at self-perpetuation. Yet the nature of competition in the marketplace requires decisions propelled by the quest for profit through change.

Clearly then, NASA should not be allowed to gain a stranglehold on commercialization programs. It should be required to focus solely on the basic research and exploration that it performs so well.

THE QUESTION OF PATENT LAW

One of the key issues to be resolved if space commercialization is to proceed concerns the issuance of patents. Since almost all of the manufacturing taking place in space will be based on new and innovative technologies, firms will not be willing to take the necessary considerable cost and risks unless they can be sure that their new discoveries could be patented. This issue will become more complex and pressing when multinational ventures are formed. In which country would their patents be filed? Would the patent law of any country apply to a discovery made in space? And if the governments of a particular nation had helped finance the venture, would that government hold claim on discoveries, or could they end up in the public domain? Such questions must be resolved if private firms are to take the risks and make the investments necessary to create a space industry.

One answer to the problem of space patents could be to apply the method used for discoveries made on ships at sea. In such cases, the invention is patented in the nation under whose flag the ship is registered. This would resolve questions concerning discoveries made on spacecraft of a particular nation. Multinational ventures raise more complex questions, but they, too, could be resolved through prior agreement between the nations involved. In the case of a manufacturing module from one country which was docked at a space platform of another country, the module could be treated for patent purposes as a vessel at sea.

INCONSISTANT GOVERNMENT ACTION AS A BARRIER

One of the most important barriers to space commerce stems from inconsistent government rules and actions. Investors and capital markets need a degree of certainty in factors affecting commercial activity, but they are particularly sensitive to uncertainties arising from government actions. Government effectively sets the rules of the game. If these rules are changed in an arbitrary or capricious manner, what once seemed a good investment suddenly can become hardly worthy of consideration. And if the government also chooses to compete with the private sector by offering a subsidized service, such as below-cost Space Shuttle satellite launches, private companies are doubly undercut by unreasonable government actions.

Particularly confusing to investors are contradictions between what government says and does. Example: although President Reagan has stated clearly his support for private space ventures and even has encouraged private launch services, NASA policies continue to undermine private efforts. The Department of Transportation has established an Office of Commercial Space Transportation, but procedures for licensing private vehicles are still too complex.

The White House also claims that it has no desire to "steer" technology, and yet NASA wants the government to provide seed money for specific projects. In short, there is still no clear, consistent U.S. space commercialization policy. Until a policy emerges and is followed by all agencies of government, space commercialization will be stymied.

Problems With Capital Formation

Inconsistent and burdensome federal policies can be solved through congressional and regulatory action. To facilitate such action, problem areas must be identified. Some progress already has been made and more seems likely, including the creation of a Presidential Advisory Committee on space commercialization, and the establishment of DOT's Office of Commercial Space Transportation. More important, a decision was made last year to allow the government's surplus Delta and Tital rocket systems to be privatized. Some investor resistance should dissipate as success are achieved.

A more fundamental problem, however, is the long lead time in earning a return on space investments. Some argue that a lengthy payback period means that the government must be heavily and directly involved in the capitalization of space commerce. Not only would this threaten to politicize the infant industry, but previous experience suggests it would be very wasteful of taxpayers' dollars.

A more plausible solution would be an innovative method of financing space ventures. One possible approach would create tax-exempt trust accounts that would pool the funds of small investors, enabling them to participate in financing space commercialization. These accounts would be allowed to accrue profits without being subject to taxation until such time as the profits were distributed, much as the capital gain on a stock is not taxed until it is realized after a sale.

A variant of this concept would make the investors in such accounts eligible for a 25 percent investment tax credit similar to that currently available to participants in Research and Development Limited Partnerships. The new R&D limited partnerships for small investors merely would provide them with the same opportunities to benefit from investment in long-term research and development that are currently available to upper income families.

Whatever the specific mechanism, the key to solving many of the capital formation problems will be to expand investment opportunities to a broad segment of the nation's citizens. The small investor has been the traditional backer of new and risky enterprises. He probably also would be an enthusiastic source of venture capital for space. And the creation of such opportunities would help create a constituency with an interest in space commerce and enable a broad segment of the population to reap its benefits.

THE NEED FOR INTERNATIONAL AGREEMENTS

Patent questions and other legal matters affecting space commercialization will require international discussions before the problems emerge. One obstacle to such discussions is the lack of an appropriate forum. At one time the United Nation's Committee On The Peaceful Uses Of Outer Space (COPUOS) afforded such a forum, but as with many other U.N. agencies, it has become crippled by increasing politicization.²

Although the United Nations established COPUOS specifically to help resolve the legal and technical issues associated with private endeavors in space, the body is now little more than another platform for the Third World to attack the United States. In recent years, moreover, COPUOS has adopted the philosophy of the so-called New International Economic Order, which holds that the wealth and technology developed by the industrialized world is "the common heritage of mankind," implying that the Third World has a claim on it. Following this logic, COPUOS would have part of the profits generated by space commerce redistributed to Third World nations. Such action would have a chilling effect on private investment, and foreclose the possibility of a free market economy in space.

Other U.N. actions also could hamstring space commercialization ventures. The Moon Treaty, which the U.S. wisely has not signed, threatens to hold back space commerce by calling into question private property. Then there is the U.N.'s attempt to limit the use of remote sensing data from orbiting satellites and to limit the broadcasting of information via satellite. Such actions raise questions in the minds of potential investors regarding legal aspects of space commerce projects, and hence cast doubt on the chances of investors earning an adequate return on their investment. By so acting, the United Nations is an impediment to international cooperative efforts for space-based commercial projects.

The U.S. should consider withdrawing its financial support from COPUOS if the Committee continues to frustrate space commerce.

² See Juliana G. Pilon, "How the U.N. Is Off Course in Outer Space," Heritage Foundation Background No. 407, February 8, 1985.

It should also resist pressures to sign the Moon Treaty. Instead, Washington should pursue bilateral agreements with other nations to resolve issues arising from space commerce, and cease to rely on COPUOS.

CONCLUSION

The principal barriers to the successful commercialization of outer space are not technological difficulties nor an inability of the marketplace to provide the necessary manpower, talent, or capital. Rather, the main barriers are those erected by government policies and actions that create uncertainty. If the United States is to realize the potential of space, it must create an institutional environment with the necessary flexibility, insight, and incentives. Only then will Americans gain access to the full potential of the endless frontier.

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